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OUR PRIMARY CONCERN - THE STREAM

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Environmental Health Center
Cincinnati, Ohio

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When I received the invitation to be present to talk to you today on water pollution control - with emphasis on the importance of "the stream", I questioned the need of discussing a subject to which the answer might appear so obvious. However, I was reminded of a report which I had recently read - in which recommendation was made that, since complete treatment would be needed for the sewage of City 'A' to prevent oxygen depletion in the receiving river, all other communities bordering the long stretch of stream should be required to provide a similar degree of treatment. It was apparent that the reasoning was not related to the conditions in the stream at the various cities but to the conception that all the communities should be dealt with (or penalized) equally. Such measures of equalization appear no more logical than if Albany should be required to provide facilities for docking the Queen Mary equal to those of New York since both are situated on the Hudson River. The continued reiteration of the main concerns of water pollution control - namely, uses of and conditions in the receiving waters - will, perhaps, tend to make our practices in this field more productive.

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Water has exerted a dominant influence on man throughout human history and its importance to our current civilization and economy has not lessened as Mr. Powell's paper has given witness. Yet, man has made little progress until recently in controlling water except in limited degree for water supply and irrigation. Our current economy rests in considerable degree on our successful control of water- such as our ability to supply cities with adequate quantities of domestic water and to protect them from destructive floods, and the development of waterways and harbors. Not all of the effects of our activities, however, have been constructive. Bad land usages and the destruction of forests have muddied our streams and increased flood destructiveness - and uncontrolled discharge of waste materials from communities and industry has unreasonably damaged the quality of water in our rivers. During the past many decades, increasing concern over these abuses of a basic natural resource has led to the current general acceptance of the concept of conservation for use. There appears to be general public agreement that our limited water resources must be used wisely for their many and varied needs which will increase in scope and complexity as our population and economy develops further.

Phelps(1) has pointed out one distinctive characteristic of water as compared to other natural resources, namely, that un-

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(1) Equitable Utilization of Stream Resources by Industry. Earle B. Phelps, Water and Sewage Works, 12, 495 (1952).

like such other resources as iron ore or timber, stream resources are in the public domain, administered by the state in the public interest. For the great majority of water uses, certainly those of major concern as pollution contributors, the ownership or possession of water by private parties is very temporary, and does not decrease its availability for additional use downstream. It is this quality which appears to have led to the riparian rights concept under the common law. The increasing complexities of modern life and water usage, however, have made it difficult to preserve water for downstream riparian owners "without material change in quantity or quality". The courts have not appeared to hesitate to violate, or at least strain, the basic riparian rights principle when it appeared justified in the public interest. Under such circumstances, court decisions have upheld the diversion of water from a watershed or necessary waste discharges in contravention of riparian rights. The overriding consideration in such cases has been the public benefit. Practically all states have now attempted to codify in some degree this principle as it applies to water pollution. The desirability of so doing is obvious in order to eliminate uncertainty in the application of riparian rights and, perhaps more importantly, to prevent undesirable damage prior to its occurrence.

In recently enacted water pollution control legislation, there appears to be general agreement that all legitimate water uses, including waste disposal, should receive recognition and attention, and that potential pollutants should not be permitted

to interfere with the water uses which are important to the area. That this trend is not unique to the United States is indicated by the 1949 report[2] of the River Pollution Prevention Sub-Committee, which made recommendations for the revision of water pollution control legislation in England. The recommendations included provisions (1) that "Attention ..... be paid to the varying purposes for which river water is required and the qualities that are desirable for such purposes", and (2) that the River Boards in each case make detailed surveys of the stream or part of a stream under consideration prior to the fixing of standards to be met.

Considerable attention has been given by various writers to the problems of conflicting or incompatible water uses as related to the pollution problem. Much of such writing has derived from extremists - either those serving as apologists for uncontrolled pollution or those advocating the impossible goal of eliminating all waste materials from our streams. In the Public Health Service we have believed it wrong to conceive of the resolution of the use of our water resources by competition between conflicting interests. Rather it is believed that the various legitimate uses should receive recognition in an integrated concept of "total use" with each use entitled to its proper emphasis in the public interest. The majority of water pollution

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(2) Prevention of River Pollution, Report of the Rivers Pollution Prevention Sub-Committee, Central Advisory WaterCommittee, Ministry of Health, London, His Majesty's Stationery Office, 1949.

control programs are, I believe, attempting to apply this concept in their current operations. Differences of opinion exist as to the administrative and technical methods and procedures for application of this "total use" concept. In my opinion, it is desirable that discussion of such differences take place and that the procedural variations be tried in practice - for from these variations, a progress in the form of improved practice will result.

In the application of the "total use" concept, full knowledge of the stream is of importance for it is only in the light of such knowledge that rational judgment can be formulated leading to the integration of the various uses into a totality of use to the maximum public benefit. The importance of suitable stream surveys is recognized in most current pollution control programs. The New York State Pollution Control Board, for example, is required to make adequate study of a stream and to hold public hearings after distribution of the study report to interested parties, prior to the formulation of a control program for the stream in question.

Some mention should be made at this point of the yardsticks used by control agencies in their activities. Much criticism has been leveled at control agencies for arbitrary and inflexible application of "standards". Undoubtedly, some such criticism has been justified at times, but the current trend in control operations

is undoubtedly in the direction of administrative flexibility to permit equitable solutions of individual situations in the public interest. Decreasingly does one find the freezing of "standards" or stream classifications directly in law. Increasingly, there is use of the terms "objectives" and "criteria of water quality" in regulations and reports pertaining to water pollution, thus giving recognition to the flexibility necessary for the application of the "total use" concept and for adaptation to changing conditions. The statement of "objectives" as the aims of specific pollution control activities and of "criteria of water quality" as the basis of measurement or means of forming the required judgments provides foundation for a rational program which can be understood by all parties concerned. The "stream classification" device, by which stream stretches are zoned according to the quality necessary for the intended uses, has been adopted by a considerable number of states and merits some special mention. Hoak(3) and others have pointed out the disadvantages of the establishment of such classifications on a permanent basis. However, their application to suitable stream stretches would appear to have some administrative advantages if it be understood that appropriate modifications can be made as changing circumstances may require in the public interest.

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(3) Stream Pollution Control in Theory and Practice. Richard D. Hoak, Water and Sewage Works, 99, 426 (1952).

The application of the "total use" concept requires not only the appraisal of the various stream uses but also the determination of waste contributions, and study of the stream's physical, chemical, and biological characteristics. It is only by the use of facts so derived that rational decisions can be made as to the waste loadings which may be allowable. The task is by no means simple. It includes the collection and appraisal of data on such items as quantity and variations of flow, stream water mixing characteristics, the effects of sudden stream flushes, water temperature, the determination of the quantity and pollutional characteristics of the waste discharges, the appraisal of the natural purification capacities of the stream, and the appraisal of possible undesirable biological effects. This is not a task which can be accomplished by the routine collection and analysis of data - it calls for the exercise of judgment of high quality. The collection and analysis of data, for instance, will not provide answers to such questions as - (a) on what low flow frequency or other critical condition in the stream should the pollution control program be based?, or (b) under a given set of circumstances, to what extent should allowances for future needs be made in the allocation of the pollution assimilative capacity of the stream? Necessarily, the job is highly complex but it is only by this means that the stream's natural purification capacity can be utilized and the pollution controlled at minimum cost. It should be obvious that such economy is important to all of us since

the public will ultimately pay the bill for waste treatment whether installed by municipalities or industries.

The application of the "total use" concept requires the services of well qualified technical personnel - and corresponding expenditure of funds. These services can be made available through the public control agencies - or, in the instance of industrial waste problems, by cooperation between them and industry. In my opinion, there is no question as to which is the more desirable course - industry has the "know-how" concerning its own processes and wastes to make the cooperative combination more effective and efficient than could ever be the case with action by the public agencies alone. It is highly to the credit of a considerable number of large industrial concerns, that they have now engaged in such activities in cooperation with control authorities. In the Public Health Service we have been endeavoring to foster such cooperation. In the technical seminars and training courses at the Environmental Health Center, I have observed the mutual understanding and respect engendered between industrial and control agency representatives by informal discussion of mutual problems.

The benefits of the "total use" concept can only be obtained by the full application and further development of technical knowledge with respect to the physical, chemical, and biological characteristics of streams, the characteristics and effects of pollutants, and methods for the reduction of such

effects. The gaps in the knowledge requisite to take full advantage of this procedure, are fully apparent to professional people engaged in this field. We know little, for instance, about the rate of biological metabolism of many pollutants in receiving waters, and in the absence of such knowledge cannot take suitable advantage of the stream's self purification capacity. Problems of toxicity of pollutants, either to aquatic life or humans, are particularly vexing because of inadequacies in current knowledge. Industry has not only an interest but also a real stake in seeing that the necessary research is performed to bridge these gaps in knowledge. The active participation in such research is, in my opinion, a proper responsibility of industry to be undertaken both in its own self-interest and as a civic obligation.

SUMMARY:

In summary, there is presented as a rational basis for water pollution control the "total use" concept in which all legitimate water uses receive recognition in an integrated totality with each use accorded its proper emphasis in the public interest. The use of this concept requires a primary emphasis on the stream itself and it would appear that the technical questions involved insofar as industrial wastes are concerned, can best be resolved by an active and understanding cooperation between industry and control agencies.